

Fiber Optic Development Special Case Study in Kurdistan Region And Iraq

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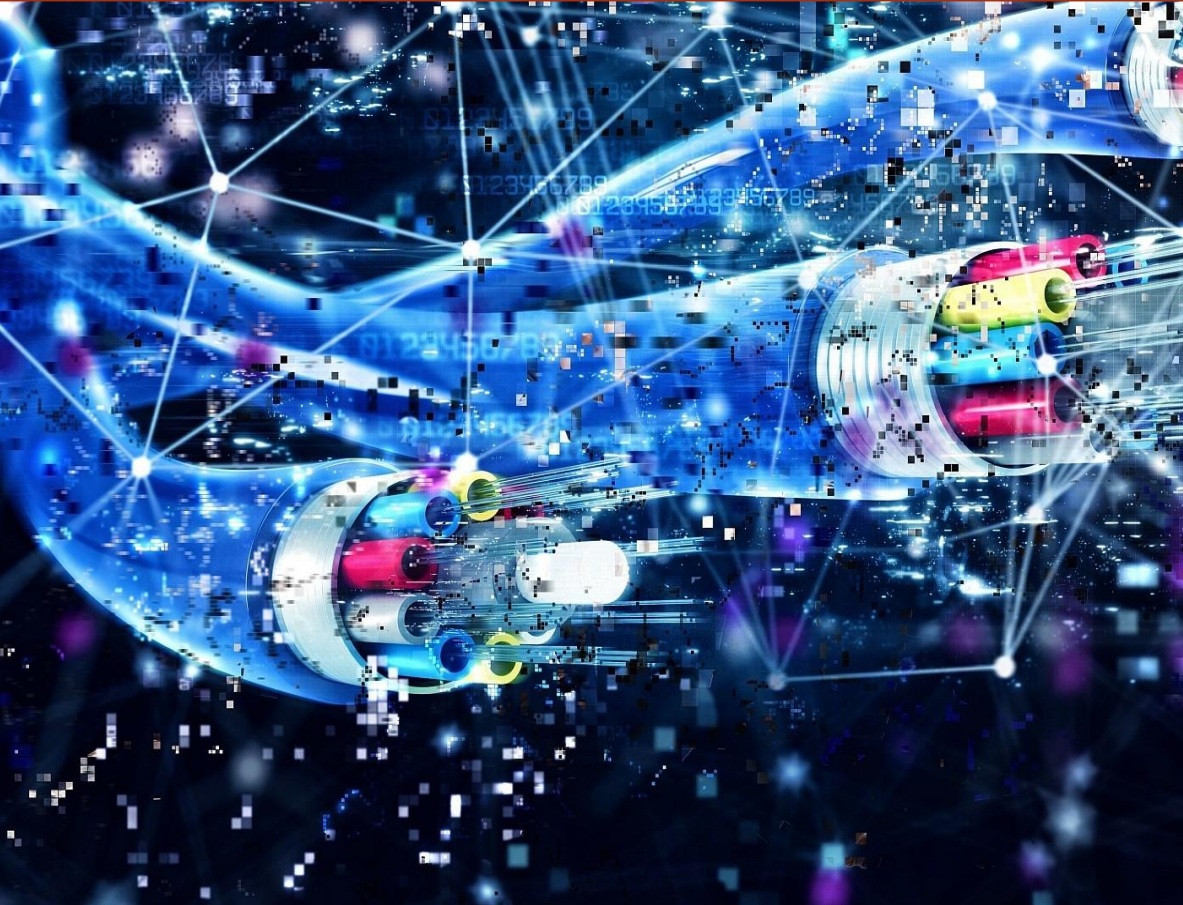
COMPUTER SCIENCE DEPARTMENT

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FIBER OPTIC OVERVIEW



Fiber optics refers to the technology of transmitting light down thin strands of highly transparent material, usually glass but sometimes plastic.

Fiber optics is used in communications, lighting, medicine, optical inspections and to make sensors. The FOA is primarily interested in communications fiber

optics, so this book will focus on that application. [Here is a short history of modern telecommunications.](#)

Fiber Optics in communications works by sending light signals

down hair thin strands of glass fiber (and sometimes plastic fiber.)

It began about 40 years ago in the R&D labs (Corning, Bell Labs, ITT UK, etc.)

and was first installed commercially in Dorset, England by STC and Chicago, IL,

USA in 1976 by AT&T. By the early 1980s, fiber telecommunications

networks connected the major cities on each coast.

Fiber Optic Devices

OLT

n optical line termination (OLT), also called an **optical line terminal**, is a device which serves as the service provider endpoint of a passive optical network.



Splicing Machine

- Fusion splicer is the machine used to weld (fuse) two optical fibers together. This process is called fusion splicing. The fiber ends are prepared, cleaved, and placed in alignment fixtures on the fusion splicer. At the press of a button, the fiber ends are heated with electrodes, brought together, and fused.



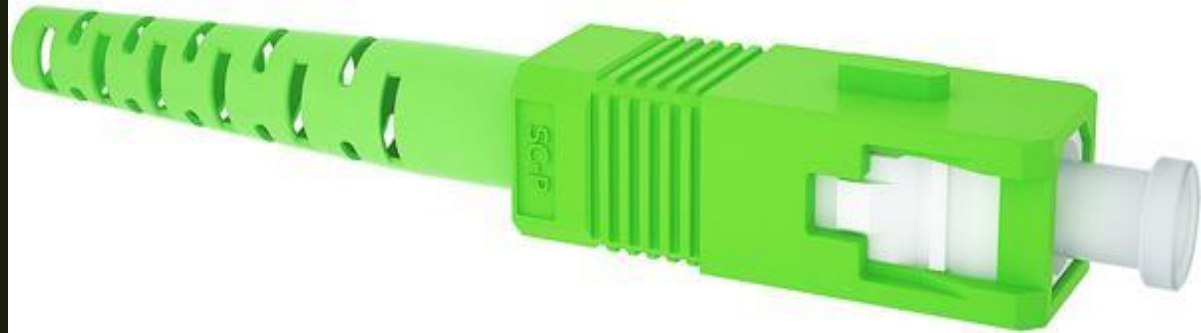
Small form-factor pluggable transceiver

- **Description**
- Description
- The small form-factor pluggable is a compact, hot-pluggable network interface module used for both telecommunication and data communications applications. An SFP interface on networking hardware is a modular slot for a media-specific transceiver in order to connect a fiber-optic cable or sometimes a copper cable.



APC Connector

- **APC** ferrules offer return losses of -65dB . In comparison a UPC ferrule is typically not more than -55dB . This may not sound like a major difference



UPC connector

- **UPC Fiber Connector.** UPC is the acronym for Ultra Physical Contact. It is an improvement of the PC fiber connector with a better surface finish





OTDR

□ Optical time-domain reflectometer

□ **Description**

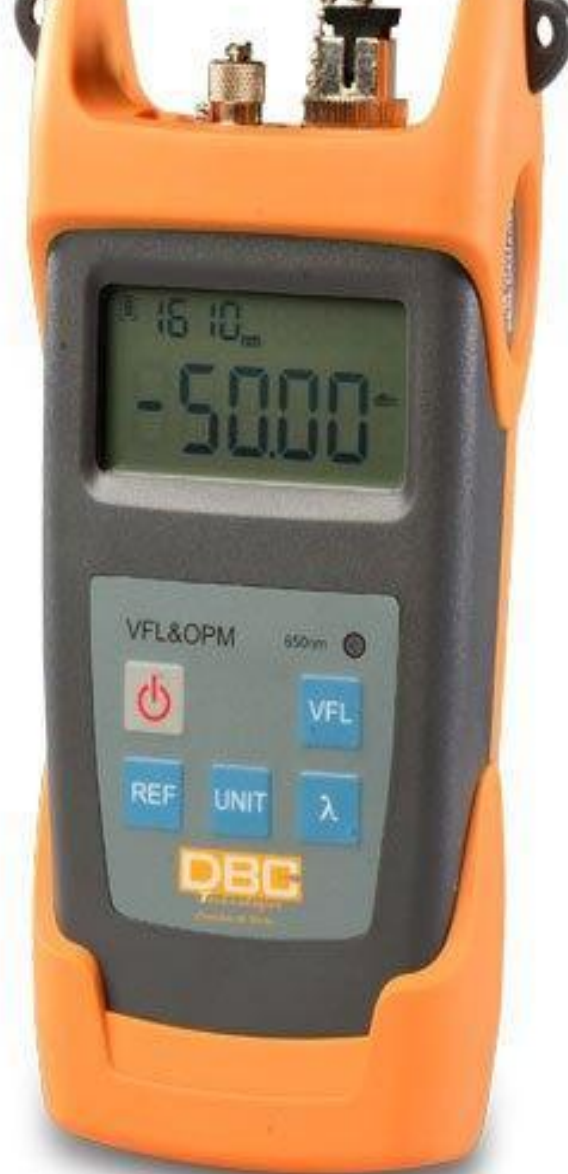
□ Description

□ An optical time-domain reflectometer is an optoelectronic instrument used to characterize an optical fiber. An OTDR is the optical equivalent of an electronic time domain reflectometer



Power Meter

- An **optical power meter (OPM)** is a device used to measure the **power** in an **optical** signal. The term usually refers to a device for testing average **power** in **fiber optic** systems. ... The sensor primarily consists of a photodiode selected for the appropriate range of wavelengths and **power** levels.



Laser



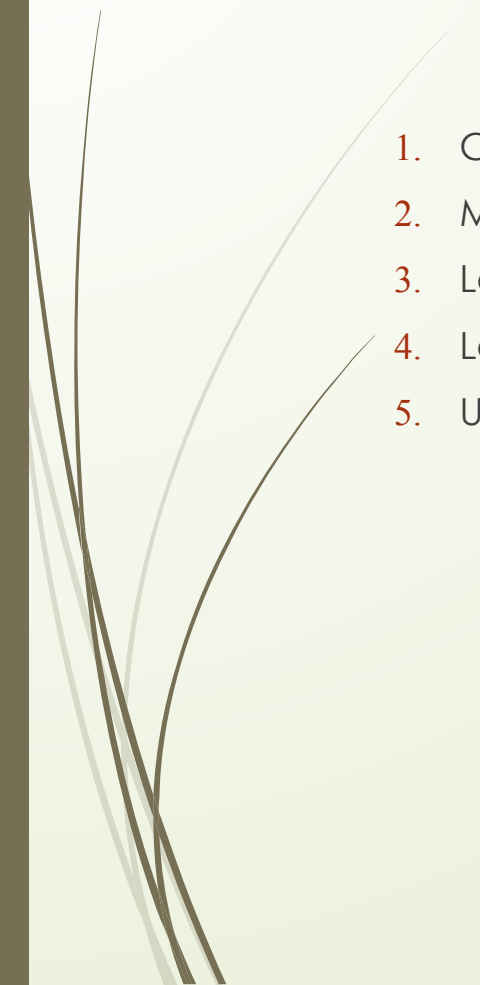
SC

FC

ST





Fiber Optic Challenges In our region

- 
1. Cost
 2. Management
 3. Lack of experience
 4. Lack of infrastructure
 5. User acceptance


Specifications for Fiber Optic Connectors			
Connector Type	Singlemode (9/125) Insertion Loss (dB)	Multimode Insertion Loss (dB)	Return Loss (dB)
ST Connector	≤ 0.5	≤ 0.5	≥ 40
LC Connector	≤ 0.25	N/A	≥ 40
SC Connector	≤ 0.25	≤ 0.5	≥ 50
FC Connector	≤ 0.25	≤ 0.5	≥ 50




$$\text{Splice Loss} = \frac{\text{Splice loss}_{A \text{ to } B} + \text{Splice loss}_{B \text{ to } A}}{2} \quad \text{Eq. (1)}$$


Example:

$$\text{Splice Loss} = \frac{0.04\text{dB}_{A \text{ to } B} + (-0.02\text{dB})_{B \text{ to } A}}{2} = 0.01 \text{ dB} \quad \text{Eq. (2)}$$



1. The most obvious challenge associated with Fiber Optic is simply storing and analyzing all that information.

2. According to survey that was done manually , the most common goals associated with Fiber Optic projects included the following:

- Decreasing expenses through operational cost efficiencies
 - Establishing a data-driven culture
 - Creating new avenues for innovation and disruption
 - Accelerating the speed with which new capabilities and services are deployed
 - Launching new product and service offerings
- 



3. Recruiting and retaining big data talent

But in order to develop, manage and run those applications that generate insights, organizations need professionals with big data skills. That has driven up demand for big data experts — and big data salaries have increased dramatically as a result.



FIBER OPTIC ADVANTAGES



Cost Saving

Time Reductions

New Product Development

market conditions

online reputation

Q&A

When? Why? How? WHAT? WHERE? WHEN? How? Why? WHAT? Why? When? WHAT? WHEN? HOW? WHEN? When? WHERE? Why? When? Why? WHEN? WHERE? WHAT? Why? When? WHO? WHERE? WHAT? WHEN? WHEN? What? WHEN? WHERE? WHEN? What? HOW? WHEN? Why? Where? WHERE? What? WHERE? When? WHERE? Why? When? Why? HOW? Where? WHERE? What? WHERE? When? WHERE? Why? When? Why? WHEN? What? HOW? WHAT? Why?